DIRECT TESTIMONY

OF

JOSEPH M. LYNCH

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2015-103-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND CURRENT POSITION WITH SOUTH CAROLINA ELECTRIC & GAS COMPANY ("SCE&G" OR "COMPANY").

A. My name is Joseph M. Lynch and my business address is 220 Operation Way, Cayce, South Carolina. My current position with the Company is Manager of Resource Planning.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I graduated from St. Francis College in Brooklyn, New York, with a Bachelor of Science degree in mathematics. From the University of South Carolina, I received a Master of Arts degree in mathematics, an MBA, and a Ph.D. in management science and finance. I was employed by SCE&G as a Senior Budget Analyst in 1977 to develop econometric models to forecast electric sales and revenue. In 1980, I was promoted to Supervisor of the Load Research

Department. In 1985, I became Supervisor of Regulatory Research where I was responsible for load research and electric rate design. In 1989, I became Supervisor of Forecasting and Regulatory Research, and, in 1991, I was promoted to my current position of Manager of Resource Planning.

Q. WHAT ARE YOUR CURRENT DUTIES AS MANAGER OF RESOURCE PLANNING?

A. As Manager of Resource Planning, I am responsible for producing SCE&G's forecast of energy, peak demand, and revenue; for developing the Company's generation expansion plans; and for overseeing the Company's load research program.

Q. HAVE YOU TESTIFIED BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA ("COMMISSION") PREVIOUSLY?

A. Yes. I have previously testified on a number of occasions before this Commission.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to present the results of a study comparing the impact on costs to customers of two strategies: The first is to complete the construction of the V.C. Summer Units 2 and 3 (the "Units"). The second is to stop construction and replace the Units with two combined cycle gas plants of the same size. The study is attached to my testimony as Exhibit No. __ (JML-1).

Q. PLEASE DESCRIBE THE METHODOLOGY USED IN THE STUDY.

A. The study uses the same methodology and structure as the similar study presented to the Commission in 2012 in Docket No. 2012-203-E. The study is based on modeling techniques that are widely accepted in the utility industry to determine the relative cost and value of alternative approaches to meeting customers' electricity needs. The models used in the study include information about system loads, load shapes (the number of hours each year that specific load levels are reached), the available units, the ramp rates of units (the speed at which units can be brought to various levels of production), the availability factors of the units (how often units are off-line or have mechanical or environmental limits on their generating capacity), the fuel costs of units (including environmental costs of burning fuel and disposing of ash or other fuel wastes), the fuel efficiency of units (how much fuel cost is incurred per megawatt (MW) of energy produced), and the capital and operating costs of any new units including things like depreciation, abandonment costs, salvage cost, production tax credits and other capital related costs or benefits. Each scenario includes a different set of assumptions about one or more variables. In this case, the models dispatched the system year-by-year for 40 years to determine the relative cost to customers under each scenario considered.

Q. WHAT SCENARIOS WERE MODELED?

A. The two alternatives -completing construction of the Units compared to replacing them with combined cycle gas plants- were analyzed under twenty-seven

(27) scenarios reflecting different assumptions concerning natural gas prices, CO_2 emissions costs and future load growth on our system.

Q. WHAT NATURAL GAS PRICE SCENARIOS WERE MODELED?

A. The three natural gas price scenarios were the Company's base case forecast of future natural gas prices, a 50% higher gas price and a 100% higher gas price forecast.

Q. WHY WERE THESE THREE NATURAL GAS PRICE SCENARIOS CHOSEN?

A. The base case is a forecast that the Company compiles using reported NYMEX gas contracts. Future prices for contracts for three years are used. Beginning in year four, the forecast escalates the NYMEX price using inflation rate forecasts provided by our economic forecasting firm IHS Global Insights.

SCE&G uses the base case forecast as a starting point in modeling because it is simple, objective and less subject to bias from subjective considerations. But this is also a limitation. The base case gas price may ignore important factors that require subjective judgment and are not reflected in current NYMEX prices or in inflation forecasts. In short, fossil fuel prices, especially natural gas prices, are notoriously difficult to forecast with confidence. For this reason, SCE&G usually conducts sensitivity analyses particularly with respect to future natural gas prices. Therefore in addition to the base case gas price forecast, two other price scenarios were developed: one with 50% higher prices than base case and a second with

100% higher prices. Higher gas prices seem very reasonable when you consider ongoing and future changes that will put upward pressure on natural gas prices. The most obvious of these changes include: 1) significantly increased demand in the power generation sector caused by the retirement of coal plants due to EPA's Mercury and Air Toxics Standards ("mats?)regulations and the Clean Power Plan as well as the practical inability to add coal capacity in the future in light of environmental regulations; 2) the opening of the domestic gas market to higher world prices through LNG exportation; 3) the increasing regulatory scrutiny of "fracking" from an environmental point of view which will tend to increase the cost of production and reduce the supply of gas; and 4) the inescapable fact that burning natural gas emits CO_2 into the atmosphere and that the gas industry will likely come under environmental regulations similar to those crippling the coal industry. The Energy Information Administration in their 2015 Annual Energy Outlook provides another scenario of forecasted natural gas prices and their forecast is shown in the study as a point of comparison. The EIA forecast falls between SCE&G's base case forecast and the 50% higher gas price forecast.

Q. WHAT CO_2 PRICE SCENARIOS WERE MODELED?

A. The three variations of CO_2 emission costs were $0, $15 and $30 per ton starting in 2020 and escalating at 5% per year.

SCE&G does not believe that there is much possibility of a $0 per ton future. The scenarios modeled at $0 per ton are not considered meaningful

scenarios in themselves. They are included as a base line to show the impact of the CO_2 component on costs.

The EPA has not finalized its Clean Power Plan. But no matter what form the final regulations take, SCE&G will need to reduce its emissions of CO_2 substantially. The cost of doing so will be significant. The study uses $15 and $30 per ton to show the impact of CO_2 compliance on the generation plan. The $30 dollars per ton estimate is the more probable of the two although the actual cost of CO_2 compliance is likely to be higher. For example, under Executive Order 12866, the federal government has established values for measuring the social cost of carbon in assessing the environmental impacts of federal action. The recommended value is $56 per ton in 2020. The $30 per ton cost is probably low but is still sufficient to show the impact of CO_2 costs on the value of the alternatives considered by the report.

Q. WHAT LOAD GROWTH SCENARIOS WERE MODELED?

A. The three load levels considered were the Company's base case load forecast and then a low and high forecast which adjusted the forecasted load plus and minus 5%.

Q. WHAT IS THE VALUE OF INCLUDING THESE DIFFERENT LOAD GROWTH SCENARIOS?

A. The load growth scenarios show that varying load up or down 5% does not affect the value of the scenarios very much at all. This is relevant because including more distributed energy resources (solar generation) or more energy

efficiency gains has the same effect as reducing load growth. Our base case forecast already includes the impact of currently mandated distributed energy resources and currently planned energy efficiency investments. There may be other important reasons to increase investment in these resources. But the study shows that increasing these resources by a substantial amount does not change the value of the nuclear Units to customers in a meaningful way.

Q. WHAT WERE THE RESULTS OF THE STUDY?

A. The study shows that in all 27 scenarios, including base gas price and $0 carbon costs, the effect of cancelling the Units and switching to natural gas generation increases the costs to our customers by a significant amount. The most reasonable scenario is gas prices at base cost plus 50% and CO_2 emissions at $30 per ton. In that scenario, cancelling the Units and switching to natural gas would increase the cost to SCE&G's customers for electric service by $278 million per year on average over the 40 year planning horizon.

Q. HAVE YOU ANALYZED THE SENSITIVITY OF RESULTS TO AN INCREASE IN THE COST TO COMPLETE THE NUCLEAR UNITS?

A. Exhibit No. ___ (JML-2) answers the question: Where we stand today, how much would the nuclear construction costs have to increase to achieve a breakeven point between completing the nuclear project and cancelling it? This study already recognizes the updates to capital costs that are before the Commission in this proceeding. Thus, the total cost of completing the nuclear plants is assumed to be

about $6.8 billion. Exhibit No. ___ (JML-2) shows how much this cost would have to increase to make the incremental revenue requirements of cancelling the nuclear project equal to those of completing it. The most reasonable scenario reflects base gas cost plus 50% and $30 per ton CO_2. In that scenario, the future capital costs of the Units would have to increase by about $3.1 billion above current forecasts to overcome the benefit of $278 million per year from completing the Units at their current cost. Or to put it another way, from where we are today, the total construction cost would have to increase from $6.8 billion to about $9.9 billion to reach the breakeven point between the alternatives.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Exhibit No. _____(JML-2)

Increase in Capital Costs of Nuclear Strategy Needed for Breakeven with Gas Strategy Based on Present Worth of Incremental Revenue Requirements Over 40 Years

($MM)

Base Load Scenario

	Base Gas	50% Higher Gas	100% Higher Gas
$0 CO_2 Price	$314	$1,602	$2,762
$15 CO_2 Price	$1,084	$2,341	$3,632
$30 CO_2 Price	$1,854	$3,102	$4,366

High Load Scenario

	Base Gas	50% Higher Gas	100% Higher Gas
$0 CO_2 Price	$336	$1,670	$2,893
$15 CO_2 Price	$1,096	$2,395	$3,731
$30 CO_2 Price	$1,897	$3,135	$4,460

Low Load Scenario

	Base Gas	50% Higher Gas	100% Higher Gas
$0 CO_2 Price	$291	$1,525	$2,598
$15 CO_2 Price	$1,062	$2,282	$3,514
$30 CO_2 Price	$1,749	$3,047	$4,259